

I claim:

1. A potable water treatment system for treating potable water that is being transferred from a potable water source to a number of potable-water using entities via a potable water line, said
5 potable water treatment system comprising:

- (a) a chemical feed system that comprises:
 - (i) a measuring device for measuring characteristics of the potable water in the potable water line,
 - (ii) a number of chemical feed sources containing a number of chemical additives,
 - (iii) a proportioning device for determining any required amounts of the number of chemical additives to be added from the number of chemical feed sources to the potable water in the potable water line, and
 - (iv) a number of controlling pumps for adding the required amounts of the number of chemical additives to the potable water in the potable water line; such that, upon determination by the measuring device and the proportioning device of the required amounts of the number of chemical additives, the required amounts of the number of chemical additives are directed via the number of controlling pumps from the number of chemical feed sources to any desired location of the potable water line.

2. The potable water treatment system of claim 1 wherein the measuring device, the
25 proportioning device and the number of controlling pumps are separate units or are combined with each other as a single unit, the proportioning device and the number of controlling pumps are combined with each other as a single unit, the measuring device and the number of controlling pumps are combined with each other as a single unit or the measuring device and the proportioning device are combined with each other as a single unit.

3. The potable water treatment system of claim 1 wherein a number of filters are used in the potable water line, such that the number of filters filter the potable water after the number of chemical additives are added to the potable water and such that the number of filters serve to remove particulate matter, control taste, control odor, control organic content, control turbidity, eliminate potential biological contamination or any combinations thereof of the potable water .

5 4. The potable water treatment system of claim 3 wherein the number of filters 5 consist of granulated activated carbon, anthracite, zeolite and clays.

10 5. The potable water treatment system of claim 1 wherein the measuring device is differential pressure, ultrasonic, magnetic or any other type that is capable of measuring quantity, quality or both of the potable water .

6. The potable water treatment system of claim 1 wherein the number of controlling pumps are piston, peristaltic or gear .

7. The potable water treatment system of claim 1 wherein the number of chemical additives are added separately or combinedly, continuously or intermittently and in any state to the potable water, such states consisting of solid, liquid, solution or any combinations thereof solution.

20 8. The potable water treatment system of claim 1 wherein effective components of the number of chemical additives consist of any required amounts of a number of chelants, any required amounts of a number of dispersants, any required amounts of a number of oxidizers, any required amounts of a number of corrosion inhibitors or any combinations thereof.

25 9. The potable water treatment system of claim 1 wherein the required amounts of the number of chemical additives are determined by measuring quantity, rate of flow, temperature, pH, chemical content, alkalinity, metal content, organic content, odiferous content, calcium hardness or any combinations thereof of the potable water .

10. The potable water treatment system of claim 9 wherein the alkalinity of the potable water is maintained such that the pH of the potable water in the potable water line is not less than 7.

5 11. The potable water treatment system of claim I wherein the number of chemical feed sources consist of one or more sections in which the number of chemical additives are separately or combinedly contained and are controlled, either directly or indirectly, by the corresponding number of controlling pumps.

10 12. The potable water treatment system of claim 8 wherein the number of oxidizers are chemicals that consist of potassium permanganate, bleach, aqueous ozone, hydroxides, chlorine dioxides, muriatic acids, other similar chemical oxidizers or any combinations thereof and are used to control taste, control odor, remove organics, remove metals or any combinations thereof from the potable water.

15 13. The potable water treatment system of claim 8 wherein the number of chelants consist of water soluble phosphates.

20 14. The potable water treatment system of claim 13 wherein the water soluble phosphates consist of phosphate polymers, phosphate monomers, phosphoric acids or any combinations thereof.

25 15. The potable water treatment system of claim 14 wherein the phosphate polymers consist of phosphoric acid esters, phosphoric acids, metaphosphates, hexametaphosphates or any combinations thereof.

16. The potable water treatment system of claim 8 wherein the number of dispersants consist of acids, low molecular weight anionic polymers or any combinations thereof.

30 17. The potable water treatment system of claim 16 wherein the low molecular weight anionic polymers consist of acrylic polymers.

18. The potable water treatment system of claim 17 wherein the acrylic polymers consist of polymers of acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid, crotonic acid, cinnamic acid, vinyl benzoic acid or any combinations thereof.

5 19. The method of operation of a potable water treatment system for treating / potable water that is being transferred from a potable water source to a number of potable water using entities via a potable water line, said potable water treatment system comprising:

- (a) a chemical feed system that comprises:
 - (i) a measuring device for measuring characteristics of the: potable water in the potable water line,
 - (ii) a number of chemical feed sources containing a number of chemical additives,
 - (iii) a proportioning device for determining any required amounts of the number of chemical additives to be added from the number of chemical feed sources to the potable water in the potable water line, and
 - (iv) a number of controlling pumps for adding the required amounts of the number of chemical additives to the potable water in the potable water line; said method comprising:
- (a) determining, by using the measuring device and the proportioning device, the required amounts of the number of chemical additives to be added to the potable water in the potable water line; and
- (b) forwarding, by using the number of controlling pumps, the required amounts of the number of chemical additives from the number of chemical feed sources to the potable water line;

25 such that the required amounts of the number of chemical additives react with the potable water to minimize deposits, to maintain any desirable components dissolved in the potable water, to remove any unwanted components of the potable water, to control corrosion or any combinations thereof.

30 20. The method of claim 19, wherein a number of filters are used in the potable water line, such that, after the number of chemical additives are added to the potable water, the number

of filters filter the potable water to control taste, control odor, control turbidity, eliminate potential biological contamination, control organic content, remove particulate matter or any combinations thereof of the potable water.

5 21. The method of claim 19 wherein the number of chemical additives are added in any state, consisting of solid, liquid, solution or any combinations thereof, separately or combinedly, and continuously or intermittently.

10 22. The method of claim 19 wherein effective components of the number of chemical additives that are added to the potable water consist of any required amounts of a number of chelants, any required amounts of a number of dispersants, any required amounts of a number of oxidizers, any required amounts of a number of corrosion inhibitors or any combinations thereof.

15 23. The method of claim 19, wherein the required amounts of the number of chemical additives are determined by measuring quantity, rate of flow, temperature, pH, chemical content, alkalinity, calcium hardness, metal content, organic content, odiferous content or any combinations thereof of the potable water.

20 24. The method of claim 23 wherein the alkalinity of the potable water is maintained such that the pH of the potable water in the potable water line is not less than 7.

25 25. The method of claim 23 wherein the number of chelants consist of water soluble phosphates which are added to decrease the alkalinity of the potable water or to inhibit corrosion or both.

26. The method of claim 22 wherein the number of dispersants are added to the potable water to control deposition of scale and sludge.

27. The method of claim 22 wherein the number of oxidizers are added to control taste, control odor, control organic content, remove metals of the potable water or any combinations thereof.

5 28. The method of claim 19 wherein the number of controlling pumps fail in an off or closed position if there is a loss or surge in electrical power .

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